



BCNET
CONNECT
HIGHER ED & RESEARCH TECH SUMMIT

Innovation & Student Learning Using Cloud Services

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Program Manager, Cloud Innovation Centre
University of British Columbia

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Student Developer
University of British Columbia



THE UNIVERSITY OF BRITISH COLUMBIA

Cloud Innovation Centre

Community Health & Wellbeing

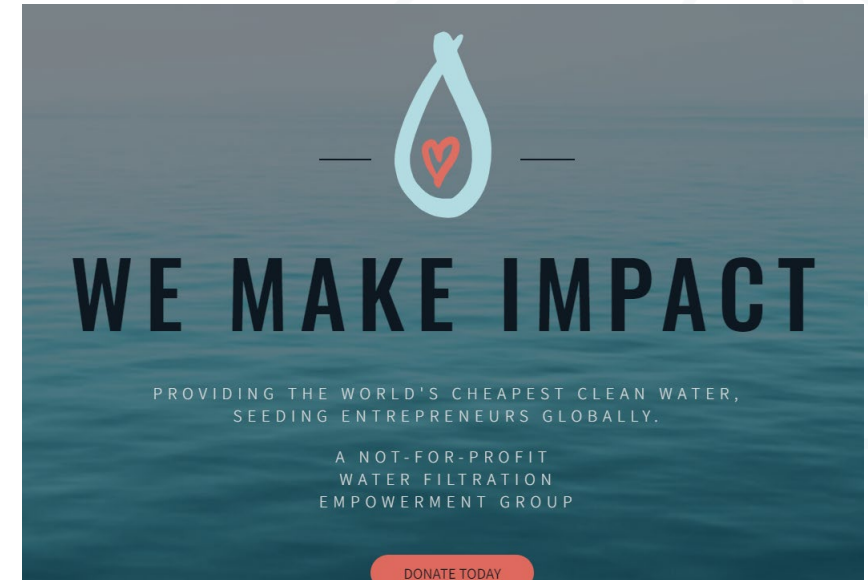
powered by aws

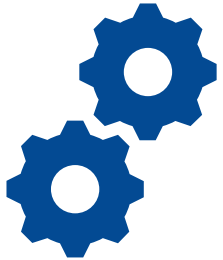


Innovation & Student Learning Using Cloud Services

WeMakeImpact - TapGives

- ❖ Not-for profit organization
- ❖ Creates & manages potable water sites in Africa
- ❖ Mission: World's Cheapest Clean Water





→ **needed a way to enable subscriptions**

→ **local development agency would take too long**

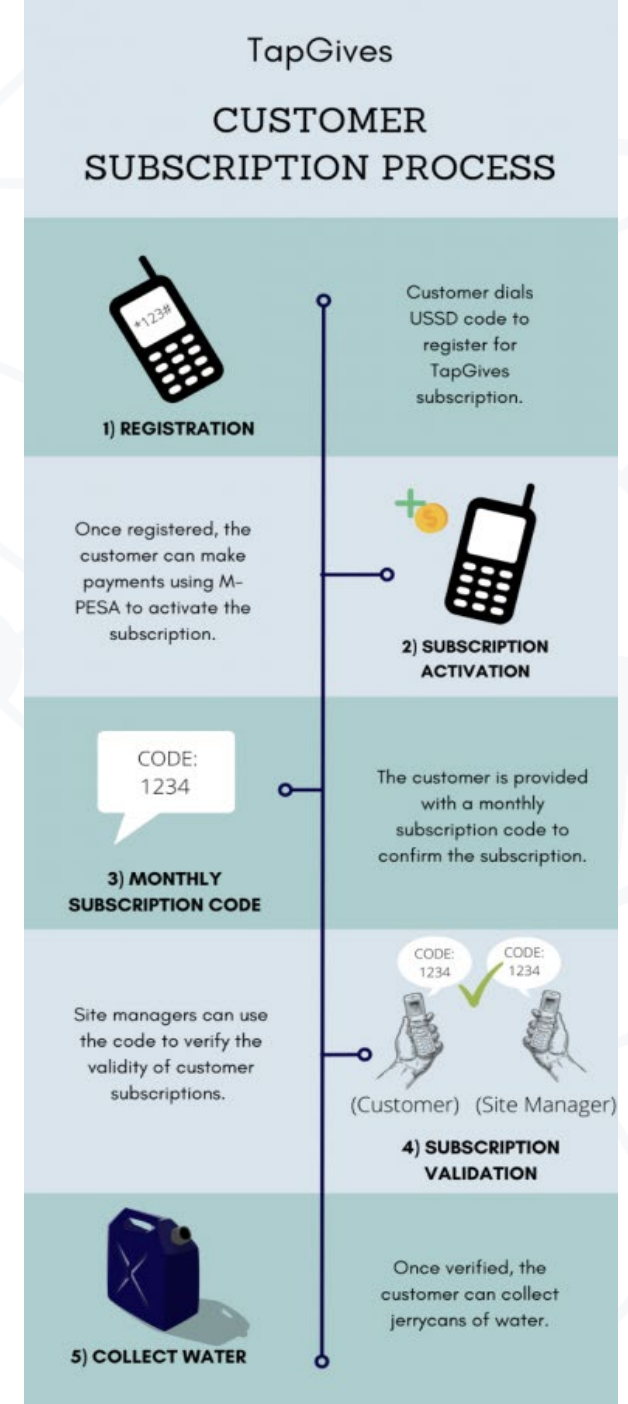
The Challenge

Clean Water Subscription Service

- ★ Limited resources
- ★ Local payment infrastructure
- ★ Local technology availability
- ★ Language

The Solution

- Web Interfaces
- USSD Application
 - Integration with MPESA
- Language options



The Challenge

Expertise Dashboard

- ★ Large data set
- ★ Disaggregated data
- ★ Partial solutions
- ★ Cost-prohibitive commercial product



Research Expertise Dashboard



What's possible?

How the CIC unlocks innovation

Focus



Working Backwards Questions

Who is the **customer**?

What is the customer problem or **opportunity**?

Is the most important customer **benefit** clear?

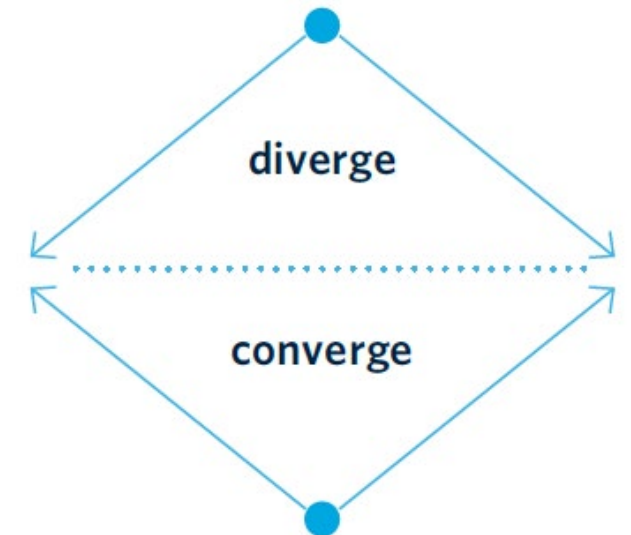
How do you know what customers **need** or **want**?

What does the customer **experience** look like?

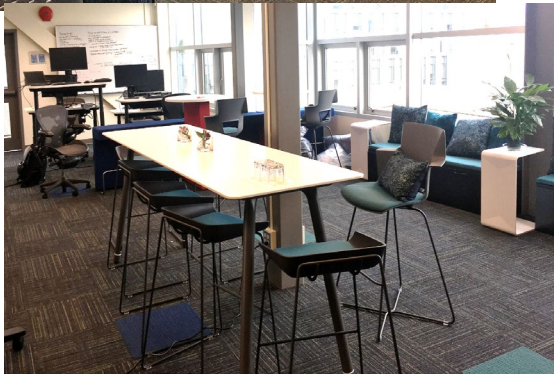
Wiki > Working Backwards

**Ideate to create
and clarify new
solutions.**

Customer problem or opportunity



Collaboration - Communication - Action & Iteration



Cloud Services

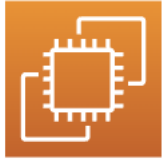




Innovation & Student Learning Using Cloud Services



Learning to use the AWS Cloud



EC2



Lambda



Elastic Container Service



Simple Email Service



Aurora



DynamoDB



Kinesis Data Firehose



Elastic Load Balancer



Cloudfront



Amazon EMR



VPC



Redshift



AWS IoT Core



Simple Service Storage



Elastic File System



Elastic Block Store

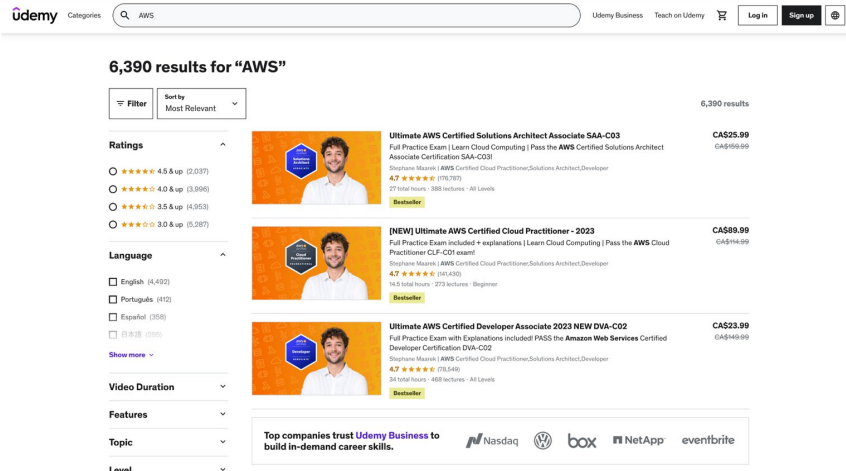
and More...

Periodic Table of Amazon Web Services

by [Twitter @awsgEEK](https://twitter.com/awsgEEK)

										amazon A athena	amazon S3 simple storage service	aws Sg storage gateway								
amazon Cs cloudsearch	aws Gs ground station	<ul style="list-style-type: none"> Analytics Application Integration AR & VR AWS Cost Management Blockchain Business Applications Compute Customer Engagement Database Developer Tools End User Computing Game Tech Internet of Things Machine Learning Media Services Migration & Transfer Mobile Management & Governance Network & Content Delivery Robotics Satellite Storage Security, Identity & Compliance 										aws Wa well-architected tool	aws Lm license manager	amazon Et elastic transcoder	aws Mh migration hub	aws Am amplify	amazon V virtual private cloud	amazon Bs elastic block store		
amazon Mr elastic map reduce	aws G glue	amazon Es elasticsearch	aws Lf lake formation	aws Ce cost explorer	amazon Ax alexa for business	amazon Cs elastic container service	aws L lambda	amazon Co connect	aws Cb codebuild	amazon Au aurora	amazon Ds relational database service	aws I iot core	aws Dd iot device defender	aws Ac auto scaling	aws Ms managed services	aws Mc kinesis media streams	aws Ad application discovery service	amazon Ag api gateway	amazon Cr cloudfront	amazon Fs elastic file system
amazon K kinesis	aws Sf step functions	aws Bu budgets	amazon Ch chime	amazon Ks elastic container service for kubernetes	aws O outposts	amazon Pi pinpoint	aws Cc codecommit	amazon D dynamodb	aws Rs redshift	aws Os iot freertos	aws Dm iot device management	aws Cf cloudformation	aws Ow opsworks	aws Mv elemental mediaconvert	aws Ds datasync	aws As appsync	amazon PI vpc privatelink	amazon Fx fsx for lustre		
amazon Ka managed streaming for kafka	amazon Mq activemq	aws Cu cost & usage report	amazon Wm workmail	amazon Ls lightsail	aws Sa serverless application repository	amazon E simple email service	aws Cd codedeploy	amazon Do documentdb	amazon Ti timestream	aws Gg iot greengrass	aws Ev iot events	aws Ct cloudtrail	aws Ph personal health dashboard	aws Ml elemental mediawave	aws Sm server migration service	aws Df device farm	aws Am App Mesh	amazon Gl s3 glacier		
amazon R redshift	amazon N simple notification service	aws Ri reserved instance reporting	amazon C elastic cloud compute	aws Ba batch	aws Lb elastic load balancing	aws Cs codestar	aws Cp codepipeline	amazon Ec elasticsearch	aws Ms database migration service	aws Ic iot 1-click	aws Sw iot site-wise	aws Co config	aws Sc service catalog	aws Mp elemental mediapackage	aws Sn snow family	aws Ga global accelerator	aws Cm cloud map	aws Ba backup		
amazon Qs quicksight	amazon Q simple queue service	amazon Bc managed blockchain	amazon Au ec2 auto scaling	aws Eb elastic beanstalk	aws Vm vmware cloud on aws	amazon Co correto	aws Cli command line interface	amazon Ne neptune	amazon Gl gamelift	aws An iot analytics	aws Tg iot things graph	aws Ct control tower	aws Sm systems manager	aws Ms elemental mediastore	aws Sf transfer for sftp	aws Tg transit gateway	aws Dc direct connect	aws Sn snow family		
aws Dp data pipeline	aws Ap appsync	amazon Su sumerian	amazon Cr elastic container registry	aws F fargate	aws Rm robomaker	aws Cg cloud9	aws Sd tools & sdks	amazon Ol quantum ledger db	amazon Ly lumberyard	aws Bu iot button	aws Dc iot partner device catalog	aws Cm console mobile app	aws Ta trusted advisor	aws Mt elemental mediatailor	amazon Wd workdocs	amazon Wo worklink	amazon Ws workspaces	amazon As appstream 2.0		
amazon Sm sagemaker	amazon Co comprehend	amazon Ei elastic inference	amazon Fc forecast	amazon Lx lex	amazon Pe personalize	amazon Po polly	amazon Rk rekognition	amazon Gt sagemaker ground truth	amazon Tx textract	amazon Tr translate	amazon Ta transcribe	aws DL deep learning amis	aws DL deeplens	aws Dr deepracer	aws If inference	aws Mx apache mxnet on aws	aws Tf tensorflow on aws			
aws Im identity & access management	amazon Cd cloud directory	amazon Co cognito	amazon Gd guardduty	amazon I inspector	amazon M macie	amazon Ar artifact	aws Cm certificate manager	aws Hs cloudhsm	aws Ds directory service	aws Fm firewall manager	aws Km key management service	aws O organizations	aws Sm secrets manager	aws Sh security hub	aws S shield	aws Ss single sign-on	aws Wf web application firewall			

Tools To Learn AWS



The screenshot shows the Udemy search results for "AWS". At the top, it says "6,390 results for 'AWS'". Below this, there are filter options for ratings, language, video duration, features, topic, and level. The main content area displays three course listings:

- Ultimate AWS Certified Solutions Architect Associate SAA-C03**: Full Practice Exam | Learn Cloud Computing | Pass the AWS Certified Solutions Architect Associate Certification SAA-C03. Price: CAS25.99. Rating: 4.7 stars.
- [NEW] Ultimate AWS Certified Cloud Practitioner - 2023**: Full Practice Exam included + explanations | Learn Cloud Computing | Pass the AWS Cloud Practitioner CLF-C01 exam. Price: CAS89.99. Rating: 4.7 stars.
- Ultimate AWS Certified Developer Associate 2023 NEW DVA-C02**: Full Practice Exam with Explanations Included | PASS the Amazon Web Services Certified Developer Certification DVA-C02. Price: CAS23.99. Rating: 4.7 stars.

At the bottom of the search results, there is a banner for "Udemy Business" with logos for Nasdaq, VW, box, NetApp, and eventbrite.



Mentorship

The Given Challenge

- Finding potential researcher collaborators in specific areas currently requires considerable time and effort to sift through large amount of data from diverse sources.



Scopus Preview

Welcome to Scopus Preview

[What is Scopus ↗](#) [Blog ↗](#)

Solution

1

A data pipeline to ingest data about researchers from multiple data sources and aggregate them into one database.

2

A dashboard to display the data in a way to make it easy to learn about and connect researchers together.

Welcome to the Expertise Dashboard

[Advanced Search](#)**4,680**[Researchers](#)**197,790**[Publications](#)**18,970**[Grants](#)**1,117**[Patents](#)

Find Researchers

 [Advanced Search](#)

Filters for Researchers:

Faculty (0 selected)

- Faculty of Applied Science
- Faculty of Arts
- Faculty of Dentistry
- Faculty of Education
- Faculty of Forestry
- Faculty of Land and Food Systems
- Faculty of Medicine


[SHOW ALL](#)

Department (0 selected)

- Allergy and Immunology Unit
- Anesthesia, Pharmacology and

Researchers (357 results)


Faculty of Medicine
Department: Medical Genetics
Email: 


Faculty of Medicine
Department: Medical Genetics
Email: 


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Faculty of Medicine
Department: Medical Genetics
Email: 

Find Publications

[Advanced Search](#)

Publications (500 results)

Title	Year Published
Seed orchard genetics Funda T., El-Kassaby Y., Journal Of CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources Number of citation(s): 31 Keywords: Genetic diversity, Genetic gain, Population and quantitative genetics, Seed orchards, Tree breeding, Tree improvement	2012
Genetics: Prostate cancer Blaine S., Honeywell C., Allanson J., Cremin C., Dorman H.... Journal Of Canadian Family Physician Number of citation(s): 0 Keywords: n/a	2009
Genetics: Hereditary hemochromatosis Allanson J., Honeywell C., Blaine S., Cremin C., Dorman H.... Journal Of Canadian Family Physician Number of citation(s): 1 Keywords: n/a	2009

[Genetics: schizothromia](#)



██████████
Faculty of Medicine
Department: Medical Genetics
Email: ██████████
Rank: Professor
Scopus ID: ██████████
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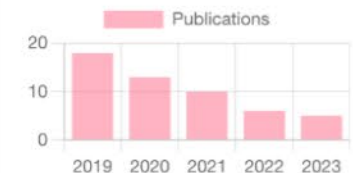
Research Highlights

877
Publications

123
H-Index (5 Years)

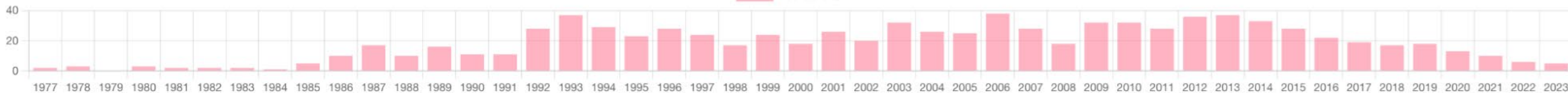
39,484,188
Funding Since 2000

Michael Hayden Publications Each Year



██████████ Publications Each Year

Publications

[OVERVIEW](#)[AREAS OF INTEREST](#)[PUBLICATIONS](#)[GRANTS](#)[PATENTS](#)

Areas of Interest

[10 Similar Researchers](#)

Huntington disease
158

Lipoprotein lipase
35

Neurodegeneration
28

Huntingtin
26

Genetics
22

[VIEW ALL AREAS OF INTEREST](#)

Publications

Title

Year Published ↓

[Restoration of a Src/Eyn Proteins Rescues Mitochondrial Dysfunction in Huntington's Disease](#)



██████████
Faculty of Medicine
Department: Medical Genetics
Email: ██████████
Rank: Professor
Scopus ID: ██████████
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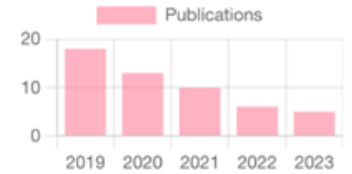
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[OVERVIEW](#)[AREAS OF INTEREST](#)[PUBLICATIONS](#)[GRANTS](#)[PATENTS](#)

Areas Of Interest

Huntington disease 158	Lipoprotein lipase 35	Neurodegeneration 28	Huntingtin 26
Genetics 22	Pharmacogenomics 22	Atherosclerosis 18	Lipoproteins 18
Mutation 18	Lipids 16	Caspase 16	Predictive testing 14
Excitotoxicity 13	Mouse model 13	HDL 12	Pridopidine 12

[SHOW MORE AREAS OF INTEREST](#)



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Rank: Professor
Scopus ID: ██████████
4/2/2023, 2:55:54 PM

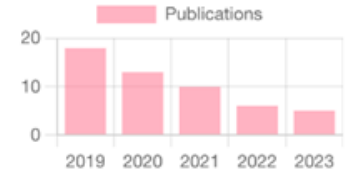
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[OVERVIEW](#)[AREAS OF INTEREST](#)[PUBLICATIONS](#)[GRANTS](#)[PATENTS](#)

Publications

Title	Year Published ↓
Full-length huntingtin is palmitoylated at multiple sites and post-translationally myristoylated following caspase-cleavage Brooks-Wilson A., Marcil M., Clee S.M., Zhang L.H., Roomp K.... Journal Of Frontiers in Physiology Number of citation(s): 0 Keywords: fatty acylation, HTT, huntingtin, huntington disease, myristoylation and palmitoylation, post-translational modification (PTM)	2023
Allele-specific quantitation of ATXN3 and HTT transcripts in polyQ disease models Zuccato C., Ciammola A., Rigamonti D., Leavitt B.R., Goffredo D.... Journal Of BMC Biology Number of citation(s): 0 Keywords: Allele-specific quantitation, ddPCR, Huntington's disease, Polyglutamine diseases, SNP, Spinocerebellar ataxia type 3	2023
Nucleoporin POM121 signals TFEB-mediated autophagy via activation of SIGMAR1/sigma-1 receptor chaperone by pridopidine Andrew S.E., Goldberg Y.P., Kremer B., Telenius H., Theilmann J.... Journal Of Autophagy Number of citation(s): 6 Keywords: ALS/FTD, c9orf72, chaperone, KPNB1/importinβ1, nucleocytoplasmic transport, nucleoporin POM121, pridopidine, sigma-1 receptor, SIGMAR1, TFEB	2023



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4/2/2023, 2:55:54 PM

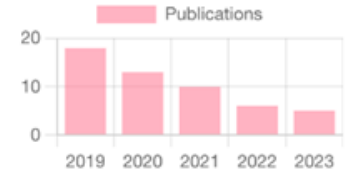
Research Highlights

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Publications

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Grants (83 results)

Grant Winner Name	Project Title	Granting Agency	Amount	Allocated Year
██████████	Canada Research Chair Tier 1	Canadian Institutes of Health Research	\$150,000	2021-2022
██████████	Canada Research Chair Tier 1	Canadian Institutes of Health Research	\$200,000	2020-2021
██████████	Canada Research Chair Tier 1	Canadian Institutes of Health Research	\$200,000	2019-2020
██████████	Canada Research Chair Tier 1	Canadian Institutes of Health Research	\$200,000	2018-2019
██████████	Canada Research Chair Tier 1	Canadian Institutes of Health Research	\$200,000	2017-2018



[REDACTED]
 Faculty of Medicine
 Department: Medical Genetics
 Email: **[REDACTED]**
 Rank: Professor
 Scopus ID: **[REDACTED]**
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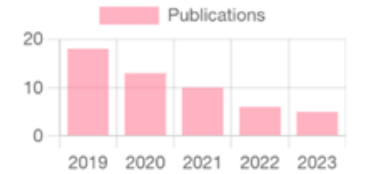
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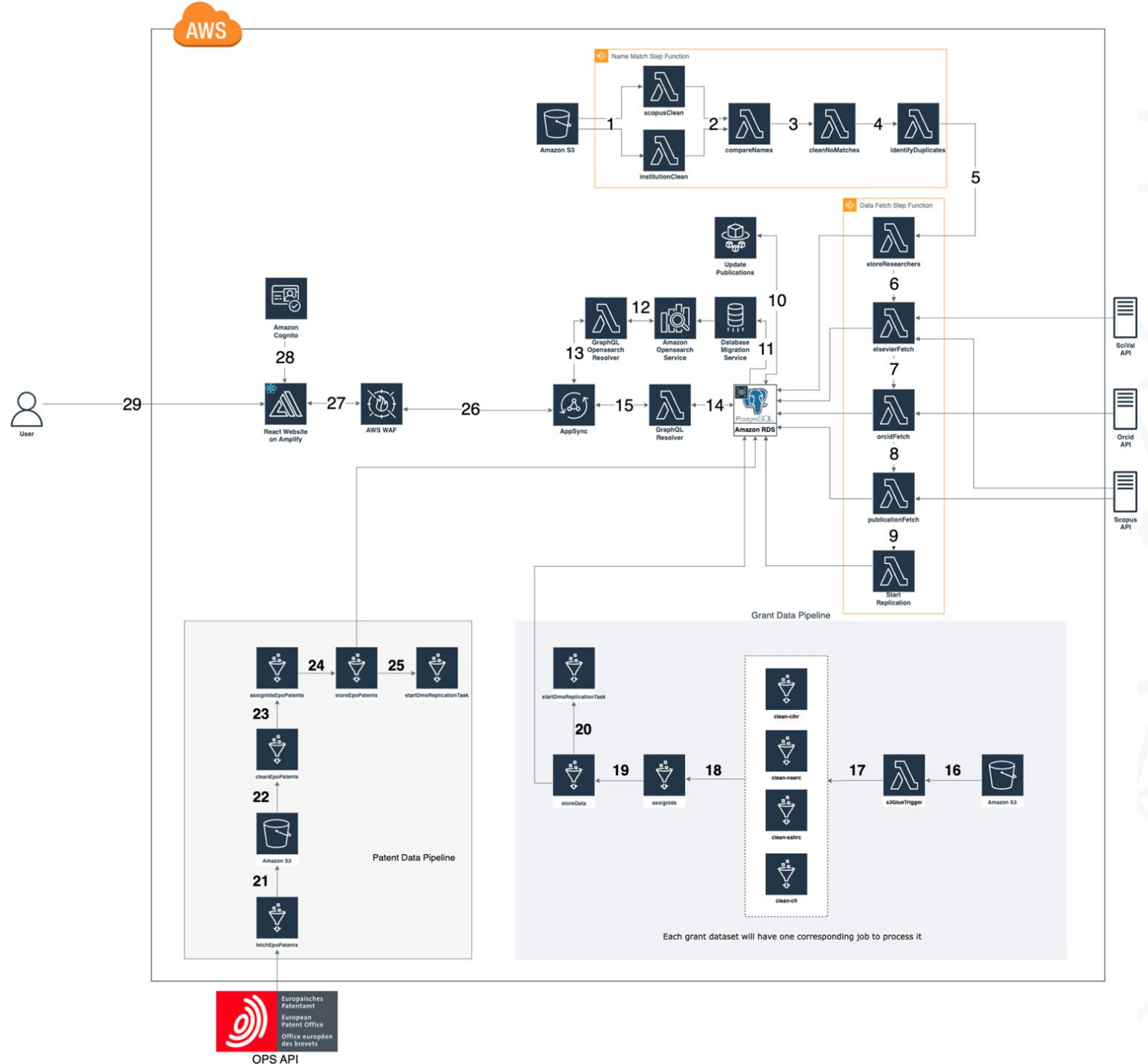
Patents (21 results)

General Information	Family Number	Year Published
Selective Reduction Of Allelic Variants Inventor Names: [REDACTED] Sponsors: IONIS PHARMACEUTICALS INC, THE UNIVERSITY OF BRITISH COLUMBIA Patent Number: CA2789038A1 , US2013046008A1 , US2015292015A1 , US2018291453A1 , US2020377946A1 Patent Status: Patent application document Classifications: Human necessities, Chemistry; metallurgy	44356119	2020-Dec-03
Allele-Specific Therapy For Huntington Disease Haplotypes Inventor Names: [REDACTED] Sponsors: THE UNIVERSITY OF BRITISH COLUMBIA Patent Number: CA2960728A1 , US2017253877A1 , US2020199595A1 Patent Status: Patent application document Classifications: Human necessities, Chemistry; metallurgy	55532376	2020-Jun-25
Modulators Of Caspase-6 Inventor Names: [REDACTED] Sponsors: THE UNIVERSITY OF BRITISH COLUMBIA, UNIVERSITY OF HAMBURG Patent Number: US2019192524A1	58589435	2019-Jun-27

Backend Solution

Managed Services used to make the expertise dashboard possible:

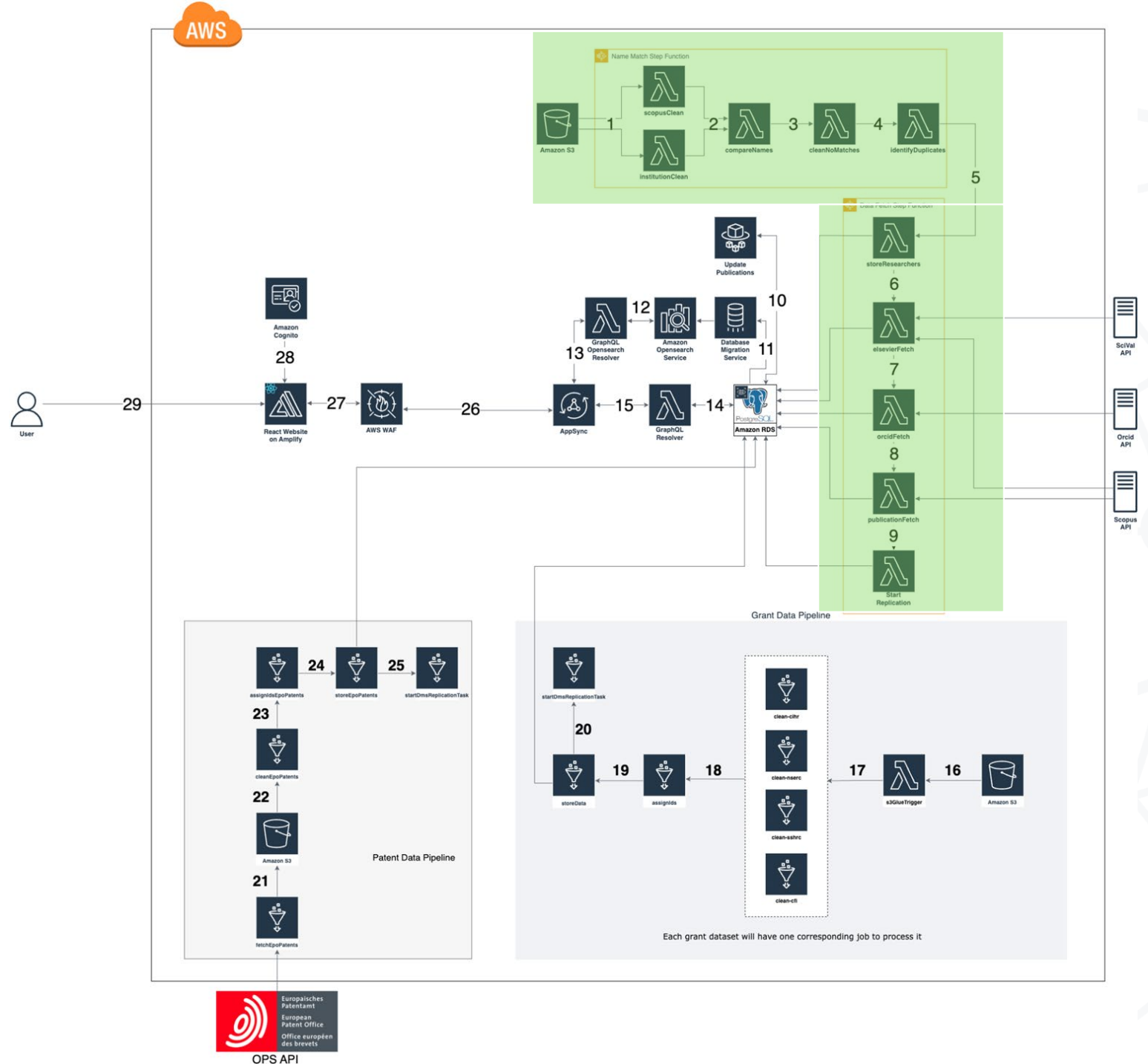
1. AWS S3
2. AWS Lambda
3. AWS RDS
4. AWS DMS
5. AWS Managed Opensearch cluster
6. AWS Appsync
7. AWS Web Application Firewall (WAF)
8. AWS Amplify
9. AWS Cognito
10. AWS Glue



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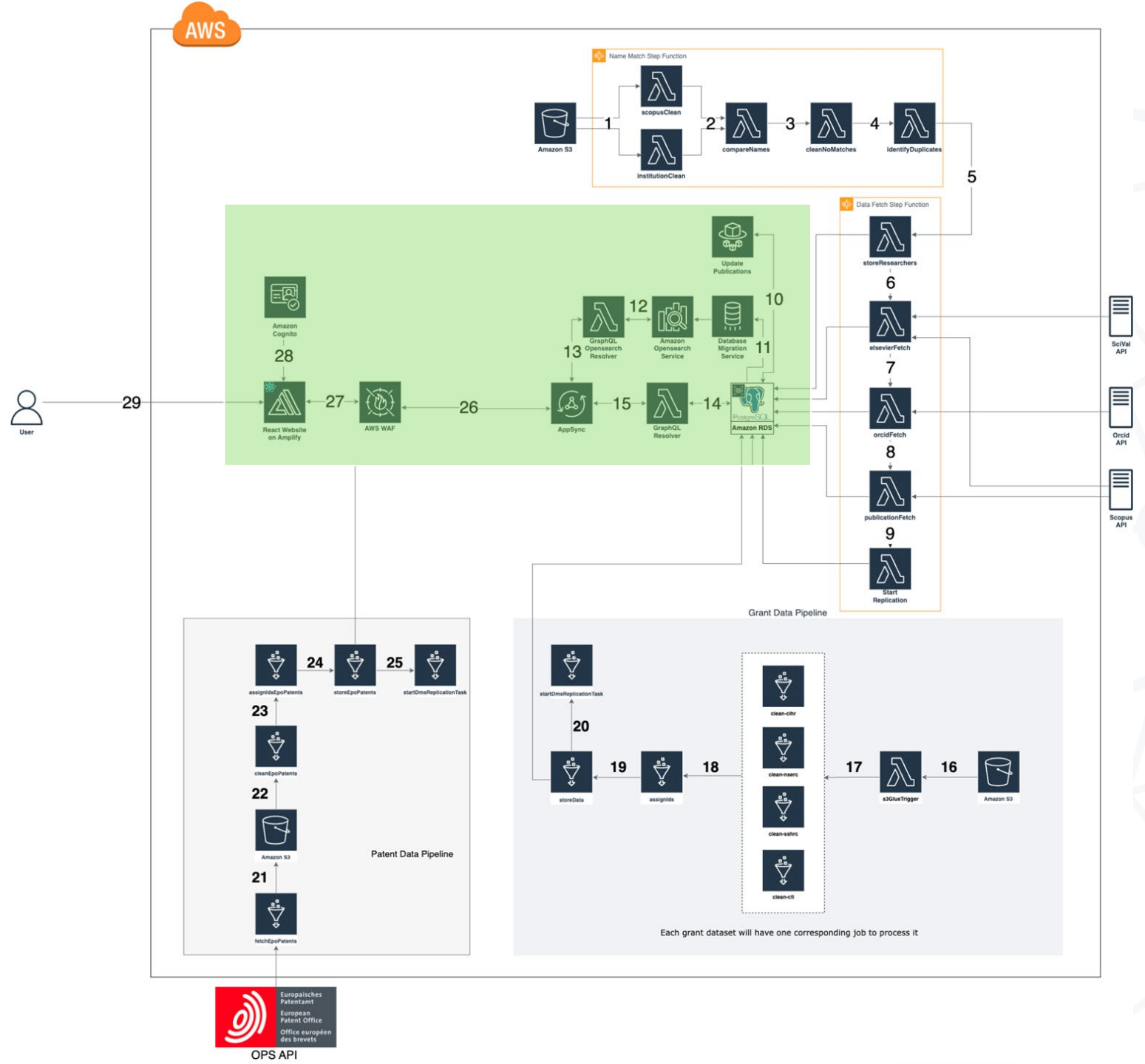
1. AWS S3
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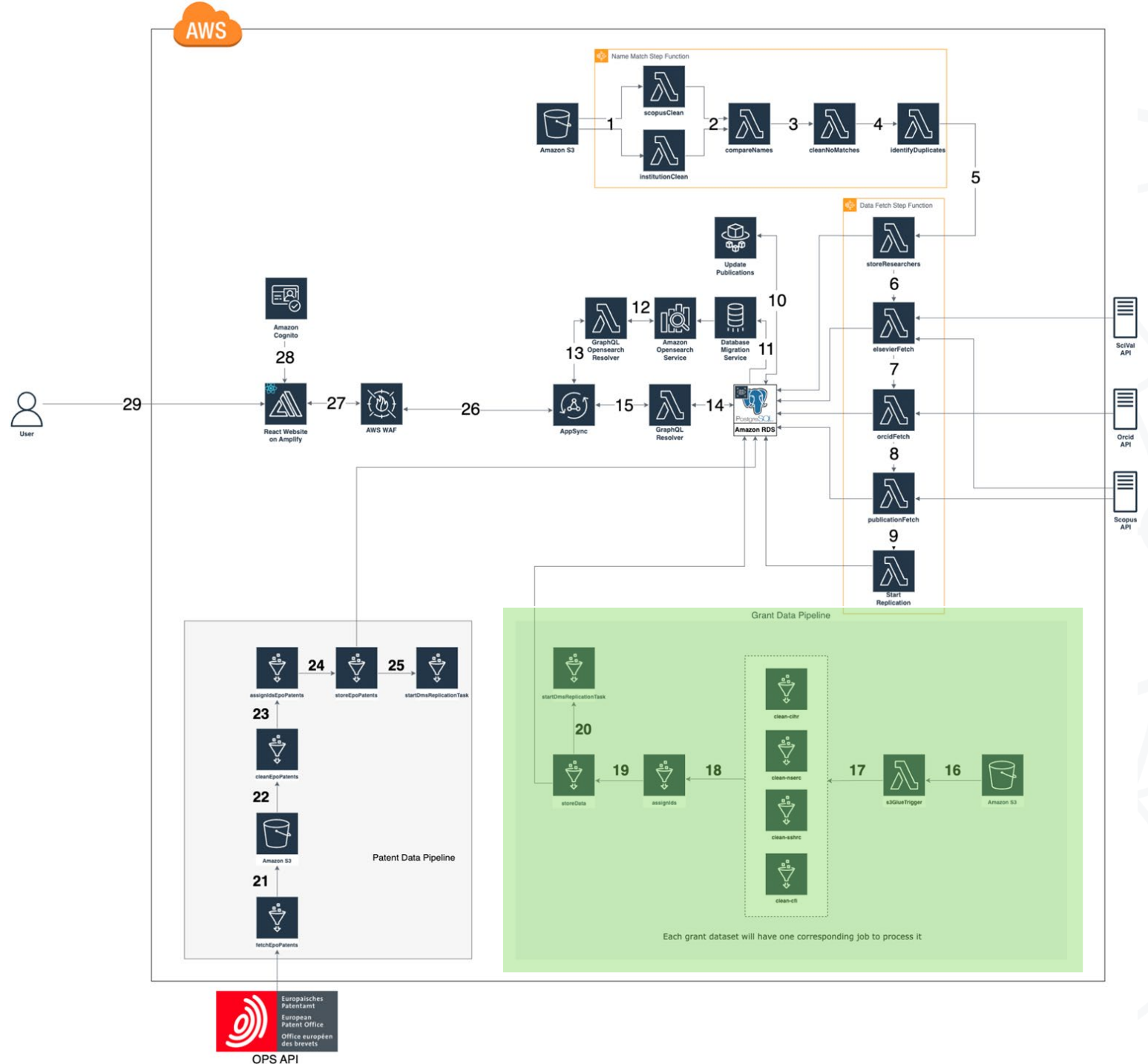
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2. AWS Lambda
3. AWS RDS
4. AWS DMS
5. AWS Managed Opensearch cluster
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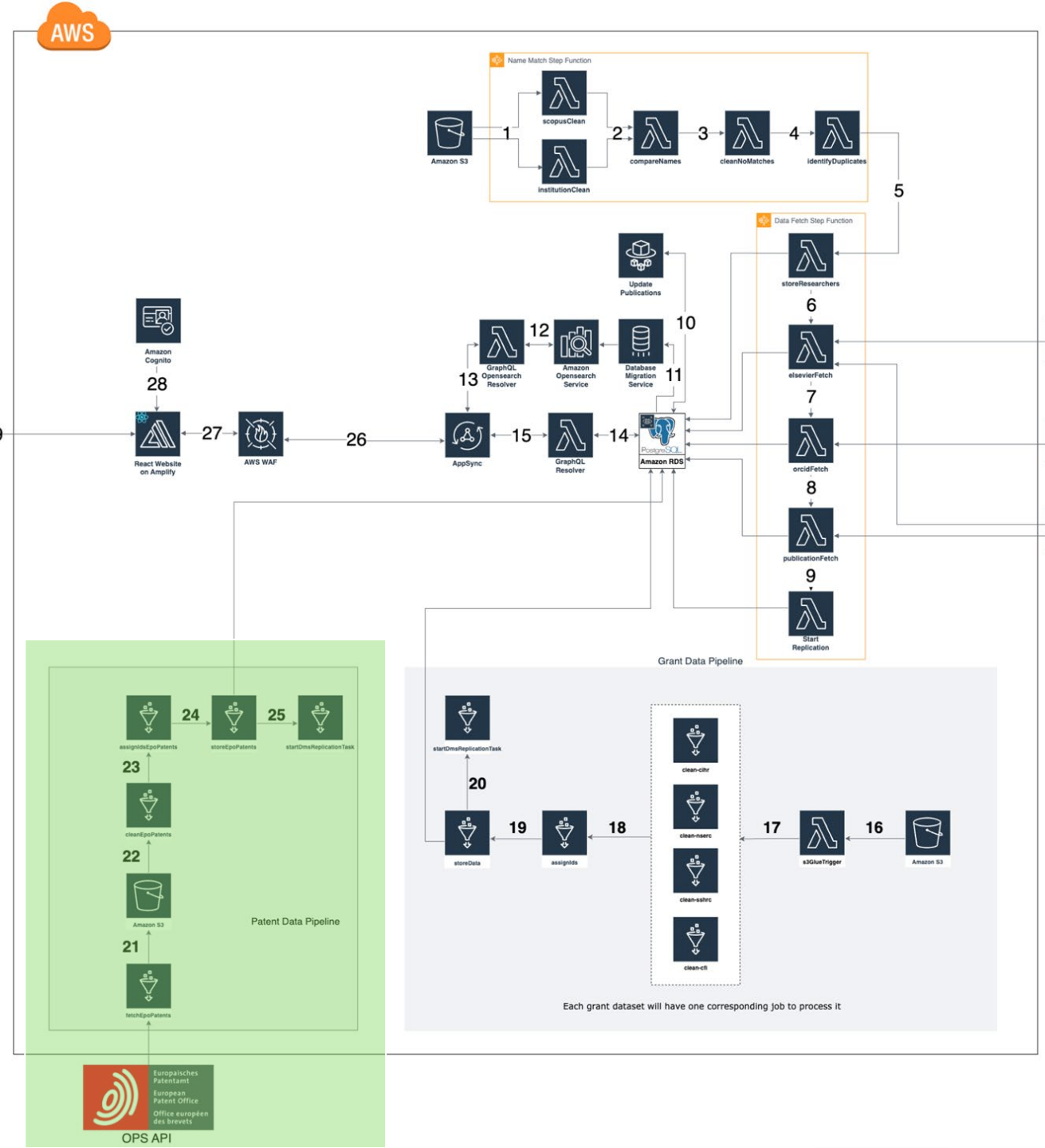
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5. AWS Managed Opensearch cluster
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7. AWS Web Application Firewall (WAF)
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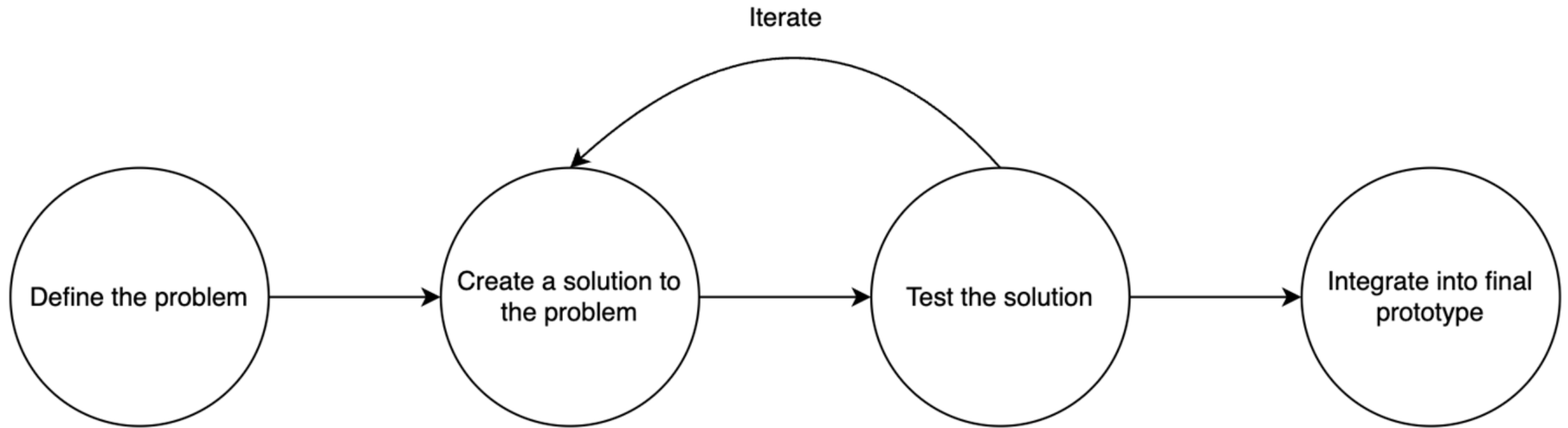
OPS API

Infrastructure as code



Cloud Development Kit

How did we build the solution?



Iteration Example

Phase One Iteration



AWS Lambda



Phase Two and Three Iteration



All of the CIC Projects are open source on Github

<https://github.com/UBC-CIC>

All projects on the UBC CIC github page include

- A High Level Architecture deep dive
- A Deployment guide
- A User guide

tien-ui 25 branches 0 tags Go to file Add file Code

This branch is 31 commits ahead, 2 commits behind main. Contribute

Commit	Message	Time
nhantien	delete an unused Amplify file	68f843d 9 hours ago 364 commits
amplify	hide all results before searching actually happens	3 weeks ago
back_end/cdk	Added search error handling and prompting	3 days ago
docs	added new docs for patent pipeline	last month
public	Add authentication and ui for sign in/ sign up page. Update app routi...	9 months ago
src	delete an unused Amplify file	9 hours ago
.gitignore	hide all results before searching actually happens	3 weeks ago
.graphqlconfig.yml	Connect amplify project to new api	9 months ago
README.md	added new docs for patent pipeline	last month
amplify.yml	Update amplify.yml	5 months ago
cfn-amplifyRole.yaml	update user/depl guide, amplify role name	last month
package-lock.json	Fixed publication titling	3 months ago
package.json	Fixed publication titling	3 months ago

README.md

Research-Innovation-Dashboard

Index	Description
High Level Architecture	High level overview illustrating component interactions
Deployment	How to deploy the project
User Guide	The working solution
Files/Directories	Important files/directories in the project
Changelog	Any changes post publish
Credits	Meet the team behind the solution

About

No description, website, or topics provided.

Readme

0 stars

2 watching

3 forks

Releases

No releases published

[Create a new release](#)

Packages

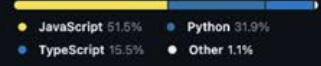
No packages published

[Publish your first package](#)

Contributors 6



Languages



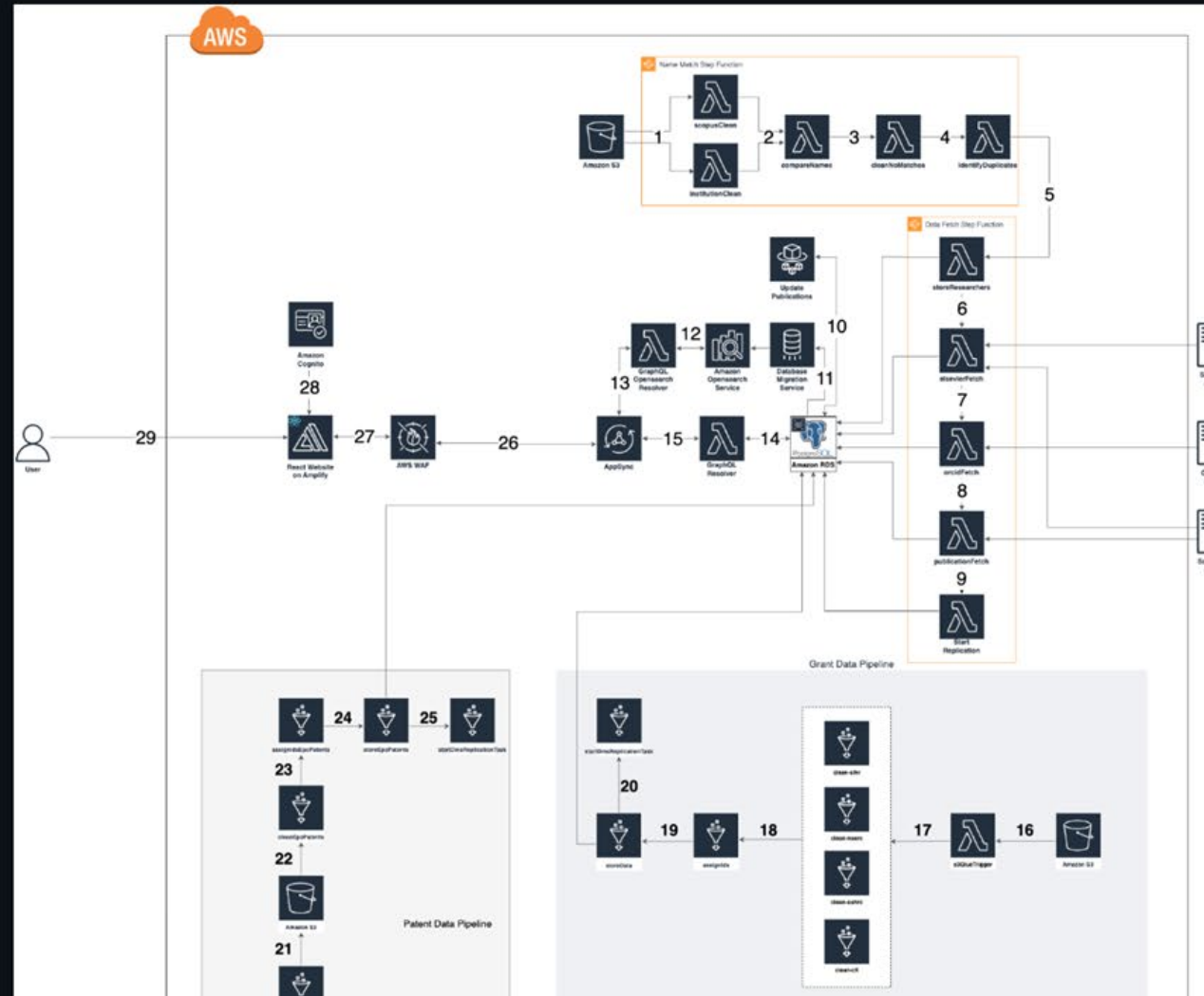
Suggested Workflows

- Based on your tech stack
- Python package** By GitHub Actions [Configure](#)
Create and test a Python package on multiple Python versions.
 - Grunt** By GitHub Actions [Configure](#)



Backend and Frontend Stack Deep Dive

Architecture



Requirements

Before you deploy, you must have the following installed on your device:

- [AWS Account](#)
- [GitHub Account](#)
- [AWS CLI](#)
- [AWS CDK](#)
- [Docker Desktop](#)

Once you have downloaded docker desktop launch and setup the application. Once the application is setup leave it running.

If you are on a Windows device, it is recommended to install the [Windows Subsystem For Linux](#), which lets you run a Linux terminal on your Windows computer natively. Some of the steps will require its use. [Windows Terminal](#) is also recommended for using WSL.

Step 1: Clone The Repository

First, clone the GitHub repository onto your machine. To do this:

1. Create a folder on your computer to contain the project code.
2. For an Apple computer, open Terminal. If on a Windows machine, open Command Prompt or Windows Terminal. Enter into the folder you made using the command `cd path/to/folder`. To find the path to a folder on a Mac, right click on the folder and press `Get Info`, then select the whole text found under `Where:` and copy with `⌘C`. On Windows (not WSL), enter into the folder on File Explorer and click on the path box (located to the left of the search bar), then copy the whole text that shows up.
3. Clone the github repository by entering the following:

```
git clone https://github.com/UBC-CIC/Research-Innovation-Dashboard.git
```

The code should now be in the folder you created. Navigate into the folder containing the Amplify project by running the command:

```
cd Research-Innovation-Dashboard
```

Step 2: Frontend Deployment

Before installing Amplify we need to create the IAM Role that gives us the permissions needed to implement this solution. Run the following line of code:

```
aws cloudformation deploy --template-file cfn-amplifyRole.yaml --stack-name amplifyconsole-exp-dash-backend-role --capabil
```

User Guide

Before Continuing with this User Guide, please make sure you have deployed the frontend and backend stacks.

- [Deployment Guides](#)

Index	Description
Home	Main search bar (Search Everything)
Researchers Search	Researcher search and related filters
Publications Search	Publications search and related filters
Advanced Search	Advanced search
Researcher Profile	Researcher profile and information page
Impact	Researcher impact by department or faculty
Metrics	Top 100 research keywords word cloud
Admin Dashboard	Update logs, Changing Scopus IDs, Viewing Flagged IDs
Updating Researchers	Process for Updating Researcher Data
Updating Grant Data	Process for Updating Grant Data
Updating Patent Data	Process for Updating Patent Data

Note: The screenshots contained in this User Guide show some information as redacted to obscure data that is not fully up to date.

Home

The Home page is a combination of both the [Researchers Search Component](#) and the [Publications Search Component](#), containing a search bar that returns both researcher and publication results that match the user-inputted search term. The researcher results are displayed on the top section of the home page, and publication results are displayed below.

Search Everything

Medicine

[Advanced Search](#)

Filter for Researchers:

Department

Allergy and Immunology Unit

Anesthesia, Pharmacology and Therapeutics

Anthropology

Research Search Results

Faculty of Medicine
Department: Emergency Medicine
Email: [redacted]

Faculty of Medicine
Department: Emergency Medicine
Email: [redacted]

Questions?



Innovation & Student Learning Using Cloud Services



<https://cic.ubc.ca/projects>

Photo Credits

Slide 3: Photos by We Make Impact at wemakeimpact.org

Slide 15: Periodic Table of Amazon Web Services © Jerry Hargrove used under [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

Slide 16: Udemy AWS Search Results
<https://www.udemy.com/courses/search/?src=ukw&q=AWS>

Slide 17: Part of the scopus home page: <https://www.scopus.com/home.uri>

Slide 18: [College building](#) from Vecteezy by Oleg Vorontsov

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